

FUNCTIONAL HAZARD ASSESSMENT - BASICS

An FHA considers the possible failure modes of top level aircraft and system functions. These failure modes include any function not supplied when required (loss), and any function supplied incorrectly or when not required. The effect of these functional failures on the aircraft and its occupants is then categorized in accordance with the definitions below.

The effect of the functional failure may be different during different phases of flight, which requires that the different phases of flight be addressed separately.

Hazards identified by a FHA are further analyzed within a relevant system safety assessment. The SSA is designed to demonstrate that the system providing the function is sufficiently robust.

SAE ARP 4761 has a detailed description of how to perform a FHA and SSA.

SEVERITY	ARP WORDING	INTERPRETATION
CATASTROPHIC	All failure conditions which prevent safe flight and landing. Loss of aircraft, and multiple fatalities.	All failure conditions that render the crew incapable of further control of the aircraft or situation, and thus place them in a position whereby they are powerless to minimize the effect of the functional failure. In these situations the worst credible outcome of the hazard scenario is assumed, and therefore in the majority of cases, this situation will result in loss of life and/or aircraft.
SEVERE MAJOR/ HAZARDOUS	Large reduction in safety margins or functional capabilities. Higher workload or physical distress such that the crew could not be relied upon to perform the task accurately or completely. Adverse effects on occupants.	Those failure conditions under which the crew retain some degree of control of the aircraft or situation, and thus able to minimize the effect of the functional failure. Failure likely to seriously injure or reduce the capacity of the crew to a level whereby they cannot be relied upon to fly the aircraft in a safe manner. Occupant injury, possibly limited numbers of fatalities. Severe aircraft damage.
MAJOR	Significant reduction in safety margins or functional capabilities. Significant increase in crew workload or in conditions impairing crew efficiency. Some discomfort to occupants.	Those failure conditions which allow the aircraft to continue powered flight, but either require a high level of additional continuous cross monitoring for the remainder of the flight, use of published or emergency procedures, or require the crew to adopt basic airman ship skills to continue the mission. Some discomfort to occupants.
MINOR	Slight reduction in safety margins. Slight increase in crew workload. Some inconvenience to occupants.	Those failures which may require the crew to exert extra physical effort or additional mental workload, such as cross monitoring of instruments to determine the actual situation, but are well within the bounds of the crews capabilities and training. Some inconvenience to occupants.